

Figure 7. A portion of a vertical section through the stipe. The junction of the palisaded cortex of the upper portion of the stipe and the portion of the cortex where the hyphæ are parallel with the surface is shown. $\times 25$.

Figure 8. The first folding of the hymenial primordium. $\times 40$.

Figure 9. A longitudinal section of the pores showing the trama, subhymenium, and hymenium. $\times 30$.

Figure 10. A cross section of the pores. $\times 30$.

Figure 11. A group of nearly mature carpophores. $\times 1$.

Figure 12. A mature carpophore of *Ceratomyces Zelleri*. $\times 1$.

THE SMUTS AND RUSTS OF UTAH—II¹

A. O. GARRETT

The following paper includes all of the work done since 1910, but the bulk of it embraces the results of an expedition to Grand and San Juan counties with Dr. Rydberg, of the New York Botanical Garden, during the summer of 1911. The southern part of Utah is practically a new field for the mycologist, and on this expedition several species were found not before reported from Utah. As a result, the western extension of these species was increased by several hundred miles.

The list of smuts and rusts given in the first paper was limited to those that had been collected by the writer. In the present paper are listed not only those collected by the writer and Dr. Rydberg on the southern trip, but all others referred to Utah in the available literature of the subject. Where the given species has not been collected by the writer, the name of the collector is clearly indicated in the text.

Acknowledgments for determinations of hosts and fungi are due to the same gentlemen who so kindly assisted the writer in the preparation of his first paper. Dr. Arthur has read over the manuscript, and to him the writer's thanks are especially due.

The species marked with an asterisk are not included in the list previously published.

USTILAGINALES

3. SOROSPORIUM SAPONARIAE Rud.

In inflorescence of *Stellaria Curtisii* (Rydb.): 2155, July 8, 1911, La Sal Mts. near Gold Basin, San Juan Co.: alt. about 2,970 m.

¹ The first paper on "The Smuts and Rusts of Utah" was published in MYCOLOGIA 2: 265-304, November, 1910.

22. UROCYSTIS ANEMONES (Pers.) Wint.

In leaves and stems of *Trautvetteria grandis* Nutt.: 2238, August 17, 1911, Abajo Mts., San Juan Co.; alt. about 3,394 m.

27.* USTILAGO HIERONYMI Schröt. P. Henn. Hedwigia 35: 213. 1896.

In leaves of *Bouteloua oligostachya* (Nutt.) Torr.: 2233, Aug. 14, 1911, Montezuma Canyon, near Monticello, San Juan Co.; alt. about 2,080 m.

28.* ENTYLOMA ARNICALE Ellis & Ev.

Bull. Torrey Club 22: 57. 1895.

In leaves of *Aster* sp.: 830, August 12, 1905, Big Cottonwood Canyon, near Brighton.

29.* ENTYLOMA CRASTOPHILUM Sacc. Michelia 1: 540. 1879.

On unknown grass: 832a, Aug. 12, 1905, Big Cottonwood Canyon.

UREDINALES

4. AECIDIUM MONOICUM Peck.

On *Arabis retrofracta* Graham: 2151, July 7, 1911, Gold Basin, La Sal Mts., San Juan Co. Dr. Arthur has proved by cultures² that the form of *Aecidium monoicum* on the *Arabis* hosts is connected with *Puccinia triseti* Erik. on *Trisetum subspicatum*, and has united the two under the name of *Puccinia monoica* (Peck) Arthur. In my previous paper, I included an *Aecidium* on *Sophia* sp. as a form of *Aecidium monoicum*. This *Aecidium* differed strikingly, however, from the specimens taken on the *Arabis* hosts. The form on *Sophia* (my number 733) had bright orange peridia that are conspicuously long; while on the *Arabis* hosts they are pale yellow and not so long. According to Dr. Arthur, the collection on *Sophia* is the aecial stage of *Puccinia subnitens* Dietel. The collection was made however at an altitude of about 2,610 meters and in a spruce-fir association, neither of which conditions point to the probable presence of *Distichlis*.

² MYCOLOGIA 4: 61. 1912.

7. PUCCINIA ALTERNANS Arthur

The above is given as the correct name of the rust reported in the writer's first list as *Aecidium* sp., No. 7. Dr. Arthur (Myco-
logia 1: 249. 1909) connects this with No. 1137 of the writer's
collection on *Bromus Porteri* (included in No. 93 of "Smuts and
Rusts of Utah" as a specimen of *Puccinia rubigo-vera*).

9. GYMNOSPORANGIUM NELSONI Arth.

On *Juniperus scopulorum* Sarg.: 2133a, August 19, 1910, Mill
D Flat, Big Cottonwood Canyon. These were old galls which
had undoubtedly infected a small *Amelanchier* bush growing in
the same clump with the Juniper, and bearing abundant aecia on
its leaves.

The galls have also been collected on the same host by Profes-
sor C. P. Smith in Cache Co. (April 1910). Indeed, this is the
commonest and most widely spread *Gymnosporangium* in Utah.
Recently it has been found that the rust formerly called *Gymnos-
porangium durum* is the telial form of *G. Nelsoni*.

II. MELAMPSORA BIGELOWII Thüm. II.

On *Salix glaucops* Anders.: 2263, August, 1911, San Juan Co.
On *Salix monticola* Bebb?: 2187, July 26, 1911, Monticello, San
Juan Co. On *Salix pachnophora* Rydb.: 2250, August 19, 1911,
Spring Creek, Abajo Mts., San Juan Co.; 2,765 m.

15. MELAMSPORELLA ELATINA (Alb. & Schw.) Arth. II.

On *Cerastium scopulorum* Greene: 2249, August 19, 1911,
Abajo Mts. near West Mountain, San Juan Co., alt. about 3,030
m. On *Cerastium Behringianum* Regel: 2174, July 15, 1911,
Gold Basin, La Sal Mts., San Juan Co.; alt. about 3,272 m.

The aecial stage of this rust is *Peridermium elatinum* Schw. &
Kze., of which collections in Utah are recorded by Arthur & Kern
in Bulletin Torrey Botanical Club 33: 435. 1906 as follows: Col-
lected by Marcus E. Jones, Aug. 6, 1905, Black Mountain, Manti;
by Pammel & Stanton (No. 642), July 27, 1900, Brush Creek,
9,000 ft.; by Rydberg & Carleton (No. 7642), August 5, 1905,
Aquarius Plateau.

21. PHRAGMIDIUM MONTIVAGUM Arth.

On *Rosa neomexicana*: 2180, July 24, 1911, Monticello, San Juan Co. On *Rosa aciculata* (Cockerell) Rydb.: 2166, July 12, 1911, La Sal Mts., San Juan Co. On *Rosa* sp. nov.: 2217, III, August 8, 1911, Scorup's pasture, Elk Mts., San Juan Co.

25. PUCCINIA CLEMATIDIS (DC) Lagerh. (*P. Agropyri*
Ellis & Ev.)

On *Agropyron Palmeri* (S. & S.) Rydb.: 2184, July 24, 1911, Monticello, San Juan Co. These plants were surrounded by an abundance of *Clematis ligusticifolia* heavily infected with the aecia. On *Agropyron tenerum* Vasey: 2204, August 4, 1911, White Canyon, San Juan Co. Again in this collection there was an abundance of heavily-infected *Clematis* plants surrounding the *Agropyron*.

34. PUCCINIA CINEREA Arth.

On *Poa Wheeleri* Vasey: 2213, Jack Spring, San Juan Co., July 30, 1911.

35. PUCCINIA CIRSIJ Lasch.

On *Carduus pulchellus* Greene: 2207, August 8, 1911, White Canyon, San Juan Co. On *Cirsium oreophilum* Rydb.: 2168, July 12, 1911, La Sal Mts., San Juan Co. On *Carduus oblanceolatus* Rydb.: 2168a, July 12, 1911, La Sal Mts., San Juan Co. On *Cirsium Tracyi* Rydb.: 2186, July 24, 1911, Monticello, San Juan Co. On *Carduus americanus* (A. Gray) Greene: 2171, July 15, 1911, La Sal Mts., San Juan Co.

42. PUCCINIA CREPIDIS-ACUMINATAE Syd.

On *Crepis intermedia* A. Gray: 2208, July 31, 1911, Elk Mts. near Bears' Ears.

44. PUCCINIA CURTIPES Howe

On *Saxifraga debilis* Engelm.: 2240, August 18, 1911, Abajo Mts., San Juan Co.; alt. about 3,545 m.

45. PUCCINIA DOUGLASII Ellis & Ev.

On *Gilia pungens* (Torr.) Benth.: 2257, August 24, 1911, Stage Station, Head Dry Valley, San Juan Co.; alt. 1,893 m.

47. PUCCINIA EFFUSA Dietel & Holw. I.

On *Viola adunca* Smith: 2154, July 8, 1911, La Sal Mts. near Gold Basin, San Juan Co.

56. PUCCINIA GUTIERREZIAE Ellis & Ev. III.

On *Gutierrezia filifolia* Greene: 2188, July 28, 1911, near Monticello, San Juan Co., alt. about 2,091 m.

58. PUCCINIA HELIANTHELLAE (Peck) Arth. II.

On *Helianthella arizonica?*: 2153, July 7, 1911, La Sal Mts., near Gold Basin, San Juan Co.

64. PUCCINIA HOLBOELLII Hornem. III.

On *Draba Helleriana* Greene: 2158a, July 9, 1911, Gold Basin, La Sal Mts., San Juan Co. On *Draba spectabilis* Greene: 2176, July 17, 1911, Gold Basin, La Sal Mts., San Juan Co.

76. PUCCINIA MENTHAE Pers.

On *Mentha Penardi* (Briq.) Rydb.: 2229, II, Aug. 14, 1911, Monticello, San Juan Co., alt. about 2,129 m. On *Monarda menthaefolia* Benth.: 2230, August 18, 1911, Montezuma Canyon near Monticello, San Juan Co.

79. PUCCINIA MONTANENSIS Ellis. II.

On *Sitanion rigidum* J. G. Smith: 2205, August 5, 1911, Armstrong Canyon above Edwin Natural Bridge, San Juan Co.

88. PUCCINIA POARUM Niessl. II.

On *Poa crocata* Mich.: 2241, August 17, 1911, Abajo Mts., San Juan Co., alt. about 3,450 m. On *Alopecurus aristulatus* Michx.: 2185, July 24, 1911, near Monticello, San Juan Co. On *Poa longipedunculata* Scribn.?: 2260, August, 1911, San Juan Co.

96. PUCCINIA SHERARDIANA Körn.

On *Sphaeralcea marginale* York: 2195, July 29, 1911, Allen Canyon, Elk Mts., San Juan Co. On *Sphaeralcea arizonica* Heller: 2222a, Aug. 9, 1911, mouth of Dry Wash, San Juan Co. On *Malvastrum dissectum* (Nutt.) A. Nels.: 2181, July 24, 1911, near Monticello, San Juan Co.: alt. about 2,121 m.

101. PUCCINIA STIPAE Arth.

On *Stipa comata* Trin. & Rupr.: 2203, August 4, 1911, White Canyon, San Juan Co.

105. PUCCINIA SUBNITENS Dietel

On *Sarcobatus vermiculatus* (Hook.) Torr. Collected by Professor Marcus E. Jones on this host at Burbank, Utah, (alt. about 1800 m.), June 26, 1906. (M. E. Jones No. 7809). Dr. Arthur has shown by cultures the relation of this *Aecidium* (*Aecidium Sarcobati* Peck) to *Puccinia subnitens*.

Since the publication of my last paper, culture work has also shown the connection between the *Aecidium* on *Atriplex hastata* and this *Puccinia*. (For reference to a collection of the aecial stage on *Sophia*, see No. 4 of this paper.)

109. PUCCINIA VIOLAE (Schum.) DC. I, III.

On *Viola canadensis* L.: 2245, August 18, 1911, Abajo Mts., San Juan Co.

129. UROMYCES ASTRAGALI (Opiz.) Schröt. II.

On *Astragalus microlobus* A. Gray: 2237a, August 11, 1911, Montezuma Canyon near Monticello, San Juan Co. On *Astragalus atratus arctus* Sheldon: 2146. July 1, 1911, Moab, Grand Co. On *Astragalus argophyllus* Nutt.: 2089, Aug. 26, 1909, Gogorza, Summit Co.

131. UROMYCES INTRICATUS Cooke. (*U. Eriogoni* Ell. & Hark.)

On *Eriogonum croceum* Small: 2198, II, July 31, 1911, San Juan Co.

132. UROMYCES PROEMINENS Pas. (*U. Euphorbiae* C. & Pk.)

On *Euphorbia Fendleri* T. & G.: 2211, August 6, 1911, White Canyon, Natural Bridge National Park, San Juan Co.

140. UROMYCES PLUMBARIUS Peck.

On *Oenothera montana* Nutt. (*Pachylophus montanus* (Nutt.) A. Nelson): 2177, July 19, 1911, La Sal Mts., Grand Co.

145.* AECIDIUM CREPIDICOLA E. & G. Jour. Myc. 6: 31. 1890

On *Crepis glauca* (Nutt.) T. & G. Given by A. G. Johnson as occurring in Utah in his paper "The Unattached Aecial Forms of Plant Rusts in North America" (No. 88, page 406).

146.* AECIDIUM OCCIDENTALE Arth. Bulletin Torrey Bot. Club 31: 7. 1904

On *Clematis Douglasii* Jones: I, collected by Mrs. Mary Strong Clemens, August 1, 1911, at Holiday Park, Uinta Mts.

147.* AECIDIUM sp.

On leaf of *Lappula caeruleascens* Rydb. A single leaf affected by a very immature aecidium was collected by one of the writer's pupils in May, 1913. This was sent to Dr. Arthur for examination. He replied that sectioning had shown pycnia at least, and that no aecium was known on this host.

148.* COLEOSPORIUM RIBICOLA (C. & E.) Arth. (*Uredo Jonesii* Peck). N. A. Flora 7: 86. 1907

On *Ribes inebrians* Lindl.: 2200, August 2, 1911, Bears' Ears, Elk Mts., San Juan Co. Alt. about 2,583 m. 2253. August 14, 1911, Montezuma Canyon near Monticello, San Juan Co. On *Ribes coloradense* Coville: 2252. August 20, 1911, Innes' sawmill, Abajo Mts., San Juan Co., alt. about 2818 m.

149.* CRONARTIUM COLEOSPORIODES (Dietel & Holw.) Arth. N. A. Flora 7: 123. 1907

On *Castilleja linariaefolia* Benth.: 2236, August 14, 1911, Montezuma Canyon near Monticello, San Juan Co. Alt. about 2,076 m.

150.* CRONARTIUM COMANDRAE Peck, Bot. Gaz. 4: 128. 1879

On *Comandra pallida* A. DC. Collected by Mrs. Clemens Aug. 14, 1911, at Holiday Park, Uinta Mts.

151.* GYMNOSPORANGIUM CLAVARIAEFORME (Jacq.) DC. I. Fl. Franc. 2: 217. 1805

On *Amelanchier nana* Nutt.: 2247, I. (*Roestelia lacerata* (Sow.) Fr.) August 19, 1911, Abajo Mts. near West Mountain, San Juan Co., alt. about 3,030 m. This is the first recorded collection of this species in the state.

152.* GYMNOSPORANGIUM GRACILENS (Peck) Kern & Bethel, I, Bull. N. Y. Bot. Garden 7: 458. 1911

On *Philadelphus occidentalis* A. Nels.: 2227, I. (*Aecidium gracilens* Peck). August 11, 1911, Dry Wash south of Abajo Mts., San Juan Co.; alt. about 2,348 m. The neighboring trees of *Juniperus monosperma* were abundantly affected with the galls of a defunct *Gymnosporangium*. The peridia of the aecia of this species are bright orange-yellow when first collected, but fade rapidly upon drying. This is the first record of the occurrence of the aecial stage of this species in the state. A record of the collection of the telia on *Juniperus utahensis* (Engelm.) Lemmon in Utah is given in N. A. Flora 7: 201. 1912.

153.* GYMNOSPORANGIUM INCONSPICUUM Kern, I, Bull. Torrey Bot. Club 34: 461. 1907

On fruit of *Amelanchier alnifolia* Nutt.: 2225, August 11, 1911, Dry Wash near Abajo Mts., San Juan Co., alt. about 2,136 m. Several trees of fairly good size bore a profusion of fruit, and scarcely a single fruit had escaped infection. The material was in fine condition. Professor Charles P. Smith also collected very fine material of this in Dry Canyon, Cache County, on the same host, Aug. 8, 1909. Still another collection in my herbarium is that made by Mrs. Mary Strong Clemens, August 15, 1911, at the mouth of the Weber river.

On fruit of *Amelanchier utahensis* Koehne: 2226, August 11, 1911, head of Dry Wash, near Abajo Mts., San Juan Co. Not so

abundant as on *Amelanchier alnifolia*, nor apparently so perfectly developed.

This aecidium was described by Kern as *Roestelia Harknessianoides*.

154.* MELAMPSORA ALBERTENSIS Arth. II, Bull. Torrey Bot. Club 33: 517. 1906

On leaves of *Populus tremuloides* Michx.: 2248, August 19, 1911, Abajo Mts. near West Mountain, San Juan Co., alt. about 3,030 m. Dr. Arthur has confirmed by cultures that this rust has its aecia on *Pseudotsuga mucronata* (Arthur; Cultures of Uredineae in 1911—Mycol. 4: 58. 1912).

155.* PHRAGMIDIUM OCCIDENTALE Arth.; Earle, in Greene, Pl. Baker. 2: 3. 1901

On *Rubus parviflorus* Nutt.: 2246, August 18, 1911, Abajo Mts. below Innes' sawmill. Alt. about 2,788 m. This rust has also been collected in Emigration Canyon, Salt Lake County.

156.* PUCCINIA ACROPHILA Peck Bot. Gaz. 6: 227. 1881

On *Synthyris laciniata* (A. Gray) Rydb.: 2136, August 24, 1910, mountains above Lake Blanche, Big Cottonwood Canyon, Salt Lake County.

Mrs. Mary Strong Clemens collected the same species of rust on *Synthyris pinnatifida* Wats. at Mt. Minnie, Little Cottonwood Canyon, Salt Lake County, on August 16, 1911. The type was collected in Utah on the last-named host by Professor Marcus E. Jones.

157.* PUCCINIA ACTINELLAE (Webb) Syd. Monogr. Ured. 1: 4. 1904

On *Tetaneuris leptoclada* (A. Gray) Greene: 2201, Aug. 3, 1911, rim-rock above Armstrong Canyon near Edwin Natural Bridge, San Juan County; alt. about 1,788 m.

158.* PUCCINIA ADOXAE DC. Flore Franc. 2: 220. 1805

On leaves and stems of *Adoxa Moschatellina* L.: 2239, August 17, 1911, Abajo Mts., San Juan Co., at about 3,333 m. alt.

- 159.* *PUCCINIA ALBULENSIS* Magn. III, Ber. Deutsch. Bot Ges.
8: 169. 1890

On *Veronica Wormskjoldii* R. & S. (*V. alpina* Amer. Auct.): 736, July 10, 1905, Alta Valley, head of Little Cottonwood Canyon, Salt Lake Co., at about 2,878 m. 855, August 23, 1905, Big Cottonwood Canyon, 2,650 m. Not very common. Exsic. Fungi Utahenses 94.

- 160.* *PUCCINIA CIRCAEAE* Pers. Roemer, Neues, Mag.
1: 119. 1794

On *Circaea pacifica* Aschers & Magnus: 2131, August 19, 1910, Mill D, south fork Big Cottonwood Canyon, Salt Lake County.

- 161.* *Puccinia Clementis* Garrett, sp. nov. III.

III. Telia amphigenous (or rarely on stem or silique), not very numerous, scattered or occasionally confluent; roundish or elliptical, 1-5 mm. across; pulvinate; umber-brown; rather tardily naked, the ruptured epidermis plumbeous, usually easily discernible; teliospores $32-39 \times 15-19 \mu$; the upper cell umbonate at the apex, the umbo as much as 2.6μ long. Spores granular, and indistinctly striate, but slightly constricted at the septum.

Collected by Mrs. Mary Strong Clemens, Bald Mountain, Uinta Mts., on *Parrya platycarpa* Rydb., August 10, 1911.

- 162.* *PUCCINIA COMMUTATA* Syd. I, Monogr. Ured.
1: 201. 1904

On *Valeriana occidentalis* Heller. I (*Aecidium Valerianearum* Duby) was collected by Mrs. Mary Strong Clemens at Pharaoh's Glen, Parley's Canyon, August 4, 1911. The material was in especially good condition.

- 163.* *PUCCINIA GLOBOSIPES* Peck Bull. Torrey Bot. Club
12: 34. 1885

On *Lycium Andersoni* A. Gray. Collected by Professor Marcus E. Jones at Le Verkin, 909 m. altitude, and reported in his "Contributions to Western Botany" No. 7, page 730, 1895. I have not seen the specimens.

164.* PUCCINIA GRINDELIAE Peck Bot. Gaz. 4: 127. 1879

On *Chrysopsis Bakeri* Greene: 2223, August 9, 1911, Dry Wash, San Juan Co.; alt. about 1,818 m.

165.* PUCCINIA GROSSULARIAE (Schum.) Lagerh. III, Ured. Herb. Fr. 60: 1895

On *Carex* sp.: 2221, Aug. 8, 1911, near Kaigalia pasture, Elk Mts., San Juan Co.

166.* PUCCINIA KOELERIAE Arth. Mycologia 1: 247. 1909

On *Koeleria gracilis* Pers.: 2231, Aug. 14, 1911, Montezuma Canyon near Monticello, San Juan Co., alt. about 2,076 m. In the original description of this rust, *Berberis aquifolius* is given as the host of its aecial stage.

167.* PUCCINIA MUHLENBERGIAE A. & H. Bull. Lab. Nat. Hist. State Univ. Iowa 5: 317. 1902

On *Muhlenbergia gracilis* H.B.K.: 2228, August 11, 1911, head Dry Wash, near Abajo Mts., San Juan Co. On *Muhlenbergia Richardsonii* (Trin.) Rydb.: 2232, August 14, 1911, Montezuma Canyon near Monticello, San Juan Co., alt. about 2,076 m. The aecium of this species is said to be found on *Callirrhoe involu-crata* (*Muhlenbergia*, Jan. 1912, page 31).

168.* PUCCINIA OBLITERATA Arth. I, Mycologia 1: 250. 1909

On *Aquilegia caerulea* James: 2160, July 11, 1911, head of Gold Basin, La Sal Mts., San Juan Co., alt. about 3,242 m. (In the original description of this rust, *Agropyron biflorum* and *A. caninum* are given as the hosts for the telial stage.)

169.* PUCCINIA PENTSTEMONTIS Peck, I, II, III, Bull. Torrey Bot. Club 12: 35. 1885

"On *Pentstemon confertus* var. *caeruleo-purpureus* Gray" (= *P. procerus* Dougl.) Collected by Marcus E. Jones, at Panguitch Lake, 2,520 m. alt.

170.* *Puccinia Pseudocymopteridis* Holw. I, III, N. A. Uredineae 1⁴: 91. 1913

On *Pseudocymopterus montanus* (A. Gray) C. & R.: 2161, I, July 12, 1911, near Gold Basin, La Sal Mts., San Juan Co. 2244, I, III, Aug. 18, 1911, Abajo Mts. below Innes' sawmill. On *Pseudocymopterus Tidestromii* C. & R.: 2150, July 5, 1911, La Sal Mts., San Juan Co. near Gold Basin.

171.* *Puccinia Rydbergii* Garrett, sp. nov. III.

Telia small, amphigenous, chestnut-brown, tardily pulverulent, surrounded by the ruptured plumbeous epidermis, often confluent. Teliospores cinnamon-brown, elliptical, rounded at both ends, $26-32 \times 16-18 \mu$; germ-pore at apex of upper cell and near the base of the lower cell; pedicels hyaline, fragile.

On *Sedum stenopetalum* Pursh: 2152, July 7, 1911, mountains above Gold Basin, La Sal Mts., San Juan Co.; alt. about 3,390 m. Collected by Rydberg & Garrett.

This species differs from *Puccinia Rhodiolae* B. & Br. mainly in the uniformly smaller spores.

172.* *Puccinia Sieversiae* Arth. Bull. Torrey Bot. Club 31: 3. 1904

On *Sieversia turbinata* (Rydb.) Greene. Collected by L. N. Goodding (No. 1377), at Fish Lake, July 17, 1902.

173.* *Puccinia tardissima* Garrett, sp. nov. II, III.

II. Uredosori amphigenous, elongated, dull cinnamon-brown; uredospores spherical to elliptical, verrucose, yellowish-brown, $17-21 \times 21-23 \mu$; germ-pores 4, scattered.

III. Telia like the uredosori, but darker; very rarely met with, the teliospores usually occurring mixed with the uredospores. Teliospores dark-brown, elliptical, $21-24 \times 25-35 \mu$; their walls thin.

On *Arenaria* sp.: 2116, Oct. 9, 1909, mountain-side south of Wasatch Resort, Little Cottonwood Canyon, Wasatch Mts. Type.

Also collected by E. Bethel in II only on *Arenaria subcongesta* (Wats.) Rydb., Aug. 23, 1907, at Ouray, Colo., and by E. T. & E. Bartholemew on *Arenaria congesta* Nutt., Aug. 30, 1913 (No.

5232), Yellowstone Park, Wyo. This latter collection shows the teliospores as sparse as in the collection made in Utah in October.

This species has been confused with *Puccinia modica* Holw., from which it differs especially in the very thin walls of the teliospores and in their sparse production.

174.* PUCCINIA TUMIDIPES Peck, Bull. Torrey Bot. Club
12: 34. 1885

On *Lycium pallidum* Miers.: 2196, July 31, 1911, Hammond Canyon, Elk Mts., San Juan Co., alt. about 1,434 m.

175.* PUCCINIA TURRITA Arth. Bull. Torrey Bot. Club
29: 230. 1902

On *Saxifraga austro-montana* Wiegand: 2173, July 15, 1911, La Sal Mts., San Juan Co., alt. about 3,272 m.

176.* PUCCINIA VARIOLANS Hark. Bull. Cal. Acad. Sci.,
p. 15, 1884

Mentioned in Arthur & Holway's Descriptions of American Uredineae, I, page 56, as having been collected in Utah on *Aplonappus spinosus* DC.

177.* UREDO CASTILLEIAE T. & E. Proc. Calif. Acad.
5: 731. 1895

On *Castilleja affinis* H. & A. Collected by Professor Marcus E. Jones, July 19, 1894, Capitol Wash, alt. 1,500 m.

178.* UROMYCES AEMULUS Arth. Bull. Torrey Bot. Club
38: 373. 1911

On *Allium acuminatum* Hook: 363, June 3, 1904, Farmington Canyon, Davis Co., 1,700 m. alt. This species was found mixed with *Puccinia Blaisdalei* H. & A. in the collection reported in No. 80 of the writer's previous list. Dr. Arthur called attention to it in Mycologia 2: 290. 1910.

- 179.* *UROMYCES LYCHNIDIS* T. & E. I, II, III, Proc. Calif. Acad.
5: 729. 1895

On *Lychnis Drummondii* (Hook.) Wats. Collected by Professor Marcus E. Jones, August 22, near Tate Mine above Marysvale.

- 180.* *UROMYCES MYSTICUS* Arth. Bull. Torrey Bot. Club
38: 377. 1911

On *Hordeum jubatum* L. Collected by S. M. Tracy (No. 712) at Provo. Date not given (according to Dr. Arthur, as stated in the original description).

- 181.* *UROMYCES OBLONGUS* Vize. I, III. Grevillea 5: 110.
1877

On *Trifolium Parryi* A. Gray: 2172a, July 15, 1911, La Sal Mts., San Juan Co., alt. about 3,242 m. On *Trifolium scariosum* A. Nelson; 2172, July 15, 1911, La Sal Mts., San Juan Co., alt. about 3,242 m., July 15, 1911.

- 182.* *UROMYCES PSORALEAE* Peck I, III, Bot. Gaz. 6: 239. 1881

On *Psoralea micrantha* A. Gray: 2144, July 1, 1911, Moab, Grand Co., 1,212 m.

HOST INDEX OF SMUTS AND RUSTS OF UTAH

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